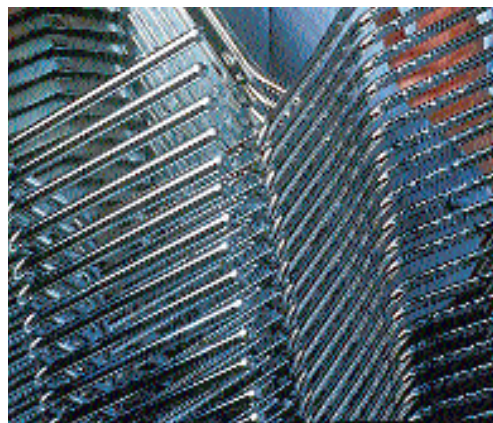


# ChromaPur™



**Chromic Acid Purification System  
Removing Contaminants for Superior Cost Savings  
and Product Quality Improved**



**eco-Tec**

**Advanced Resource Recovery  
& Purification Solutions**

# ChromaPur™

For over 40 years, chrome platers have looked to Eco-Tec for purification systems to achieve superior cost savings.

## What is ChromaPur™?

The ChromaPur™ Unit is a small, skid mounted device that automatically processes chromic acid plating solution from one or more plating tanks. It uses a simple PLC (programmable logic controller) in a control panel with a graphical display of the system's operation.

The heart of the ChromaPur™ Unit is the Recoflo® ion exchange bed, which removes metallic contaminants while allowing purified chromic acid to pass through for reuse.

## Why use ChromaPur™?

In hard chrome plating processes, metal contaminants (Cu, Fe, Cr<sup>3+</sup>, etc.) buildup in the plating bath. These lead to a decline in performance as measured by longer plating times, higher voltages, and an increase in plating defects (eg. pitting). Eventually, bath replacement becomes necessary. Fresh chromic acid must be added and the old solution must be purified or hauled off-site for disposal.

Considerable savings are possible if the metallic contamination can be removed from the spent solution with continuous purification. Savings fall into several categories:

- Chromic acid purchases are greatly reduced;
- Waste treatment costs are minimized and bath disposal is eliminated;
- Plating performance is improved, reducing rework;
- Solution conductivity is improved, reducing electrical requirements and ensuring uniform plating thickness.

## How Does ChromaPur™ Work?

A contaminated batch of chrome solution is transferred to a feed storage tank. On demand, chrome plating solution flows by gravity to the ChromaPur™ reservoir for processing. A pump mounted on the ChromaPur™ frame pumps the chrome through dual stage cartridge filters and into the resin bed where metal contaminants are removed from the solution.

Purified chromic acid flows to a Purified Storage Tank. When a preset volume of feed has been treated, the automatic regeneration begins. Regeneration uses sulfuric acid (93 - 98% w/w H<sub>2</sub>SO<sub>4</sub>) metered from a standard acid drum. It is diluted automatically to the correct strength before being pumped through the resin bed.

After regeneration, the bed is washed with water. The regeneration and wash waste contain dissolved metal contaminants, some excess sulfuric acid and traces of chromic acid. It should be properly treated prior to disposal. After regeneration, ChromaPur™ begins another cycle.

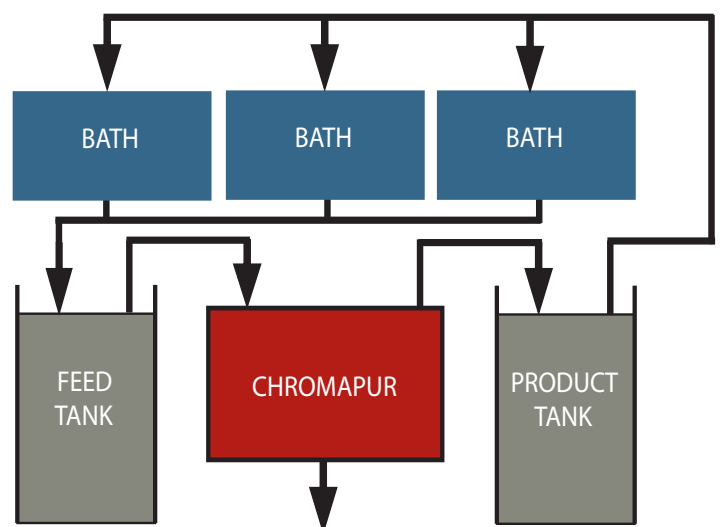
You can optimize the ChromaPur™ cycle by selecting the most suitable operating range.

- High Level - For chrome plating solutions with metal contaminants in the 15 g/L range.
- Low Level - For chrome plating solutions with metal contaminants in the 5 g/L range.

ChromaPur™ will work at either setting but it is most efficient when the correct setting is used.

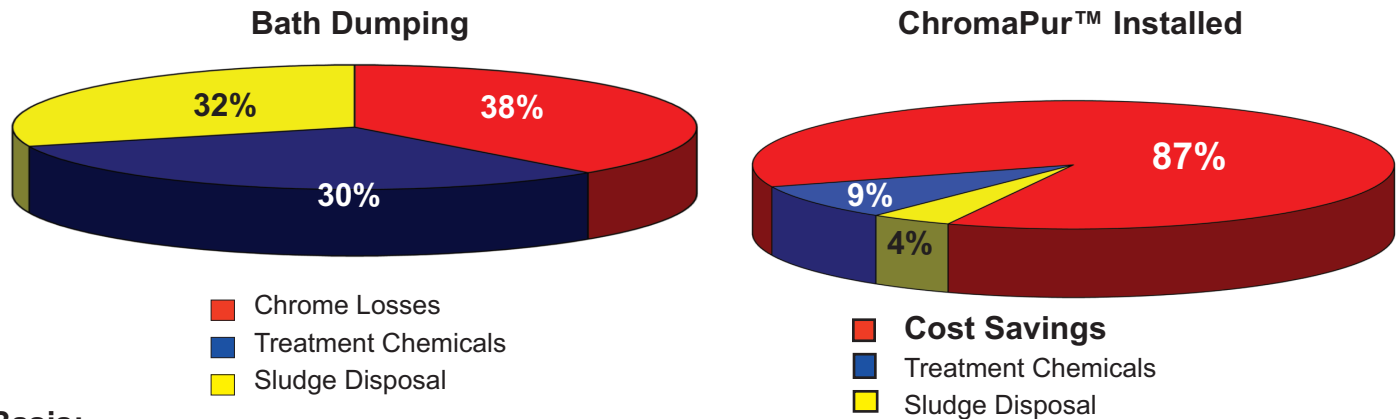
The chromic acid is diluted somewhat so that the volume of purified acid exceeds that of the feed. In most cases, the extra volume is not a problem due to the evaporation that occurs naturally as a result of the elevated temperature of the plating bath.

## ChromaPur™ Process Flow



## Cost Savings

It is easy to work out the savings you can expect with the installation of a ChromaPur™ Unit. Savings will vary depending on a number of factors such as hours of operation, chemical costs and disposal methods. These charts compare the cost of dumping and chemical neutralization with the costs of recovery with ChromaPur™.



### Basis:

- Chemical treatment with sodium metabisulfite and caustic soda
- Removal of waste material as filter cake
- Chromic acid = 255 g/L; Metals = 15 g/L at time of dump
- Chromic acid = 240g/L; Metals = 5g/L with the ChromaPur™ Unit

**Note: The ChromaPur™ Unit also makes it easier to achieve consistent finishes, so you may wish to factor in an allowance for reduction in rework.**

## Installation and Use

A detailed operating manual is included with the shipment of a ChromaPur™ Unit. These manuals include easy to understand installation instructions. The instructions offer helpful details on locating the system, piping and wiring. Installation of a ChromaPur™ Unit is simple and straightforward. After installation is complete, the Unit can be started. A reference manual includes checklists and troubleshooting guides. **No special adjustments are required as the ChromaPur™ Unit is fully tested and calibrated prior to shipment.**

Routine monitoring is recommended and log-sheets are provided for this purpose. Preventative maintenance schedules are also included in the manual. Regular maintenance requirements include the replacement of the filter cartridges. The Unit is supplied with a replacement parts kit that includes enough filters and resin to last a typical plant for about one year.

The ChromaPur™ Units also include access to 24/7 customer service. Onsite training and assistance are available, and a full stock of replacement parts can normally be shipped within twenty-four hours.

## Selecting ChromaPur™ Components

It is simple to select the right ChromaPur™ for your needs.

1. Determine the metal buildup rate using the guide below.
2. Select a ChromaPur™ Unit from the performance specifications chart on the following page. Choose a unit that provides enough metal removal capacity to offset the buildup rate.
3. Note that the ChromaPur™ capacity depends on the metal contaminant level that is to be maintained in the bath - either 5 g/L (low setting) or 15 g/L (high setting) contaminant levels.
4. Select a Feed Acid Storage Tank and a Product Acid Storage Tank from the tank specifications chart on page 8.

### Determination of Metal Buildup Rate

To calculate the removal rate, you will need to analyze your bath for metal contamination concentration at two different points in time. The resulting metal buildup rate number is then used to determine the required system size. Numbers to the right are used as an example.

#### Example:

- |  |             |
|--|-------------|
| a) First sample - metal concentration (g/L)  | <b>7.5</b>  |
| b) Second sample - metal concentration (g/L) | <b>15</b>   |
| c) Operating time between samples (hours)    | <b>115</b>  |
| d) Bath volume (litres)                      | <b>3785</b> |
| e) Metal buildup rate (g/hr)                 |             |

$$\frac{(b) - (a)}{(c)} \times (d) = (e)$$

$$\frac{15 - 7.5}{115} \times 3785 = 250 \text{ g/hr}$$

#### Notes:

- For the example case, a CP8 can remove 450 g/hr while maintaining 15 g/L of metals in the bath.
- A longer time period between samples will result in better accuracy. Wait at least two weeks before taking the second sample.
- Ensure that production levels during the sample period are typical of normal operation.
- Consider repeating the sampling exercise and check to see that results from the two periods are comparable.
- Avoid dumping, decanting, or altering the bath chemistry during the sampling period.

## ChromaPur™ Performance Specifications

### Low Setting Typical Unit Capabilities

Model Number	Metallic Removal	Flowrates (liters per hour)		
	Low Setting (5 g/L)	Feed	Product	Waste
CP6	105	45	75	80
CP8	185	85	130	130
CP10	295	130	215	200

### Low Setting Other requirements for ChromaPur™

Model Number	Flowrates (litres per hour)		
	Water	Sulfuric Acid	Evaporation Needed
CP6	100	1.5	30
CP8	180	2.6	55
CP10	290	4.0	85

### High Setting Typical Unit Capabilities

Model Number	Metallic Removal	Flowrates (liters per hour)		
	High Setting (15 g/L)	Feed	Product	Waste
CP6	250	20	35	125
CP8	450	40	65	220
CP10	700	65	105	340

### High Setting Other requirements for ChromaPur™

Model Number	Flowrates (litres per hour)		
	Water	Sulfuric Acid	Evaporation Needed
CP6	135	2.5	15
CP8	245	4.0	25
CP10	380	6.0	40

### Typical Stream compositions with ChromaPur™

ChromaPur™ Stream	Composition (grams per liter)				
	Chromic Acid (typical range)		Sulfuric Acid	Dissolved Metals	
				Low Setting	High Setting
Feed	220	270	-	5	15
Recovered Acid	130	160	-	1.5	1.8
Waste	<1	<1	24-26	1.5	2.3

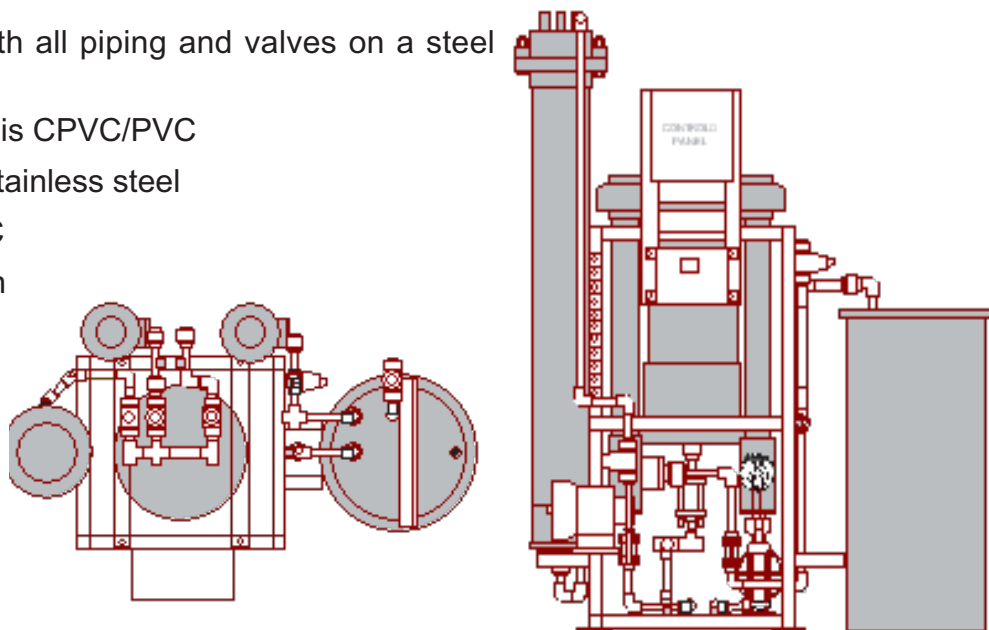
#### Notes:

- Certain chrome plating baths are not compatible with ChromaPur™. Included are those containing strontium based catalysts, and trivalent chrome plating solutions.
- ChromaPur™ Unit can operate at low setting (5 g/L) or high setting (15 g/L) metal contaminant levels

## ChromaPur™ Specifications

### The Eco-Tec ChromaPur™ Unit includes:

- Dual stage cartridge filter, diaphragm feed pump and sulfuric metering pump
- Level control modules for Purified Acid Storage Tank and Re-generant acid drum
- Skid-mounted design with all piping and valves on a steel frame
- Standard piping material is CPVC/PVC
- Standard fasteners are stainless steel
- Standard valves are PVC
- 24V control panel with graphics
- Operating & maintenance manuals (3)
- Spare parts kit



Model Number	Dimensions cm / inches			Electricity	Comp. Air (peak)	Water (peak)
	Length	Width	Height	220/1/50 110/1/60	@5.5 bar (80 psig) m³/hr (SCFM)	@2 bar (30 psig) m³/hr (GPM)
CP6	160/63	90/35	178/70	5 amps	1.5 (<1)	0.22 (0.6)
CP8	165/65			5 amps	1.5 (<1)	0.41 (1.8)
CP10	175/69			5 amps	3.3 (<1)	0.64 (2.8)

### Notes:

- The temperature of the chromic acid added to the Feed Acid Storage Tank should be less than 60°C (140°F). This ensures that the chromic acid fed to the ChromaPur™ Unit is less than 32°C (90°F). See manual for further details.
- No provision has been made for the removal of oil, grease or submicron particles from the chromic acid or the water fed to the ChromaPur™ System.
- Air must be clean, dry, oil free and filtered to 40 microns. Air filters can be supplied, if required, at additional cost.
- Water should contain less than 200 mg/L Total Dissolved Solids (as CaCO<sub>3</sub>) and must be clean (i.e. municipal source filtered to one micron).
- Sulfuric acid should be 93%-98% w/w technical grade and free of inhibitors and oxidants. See manual for details.

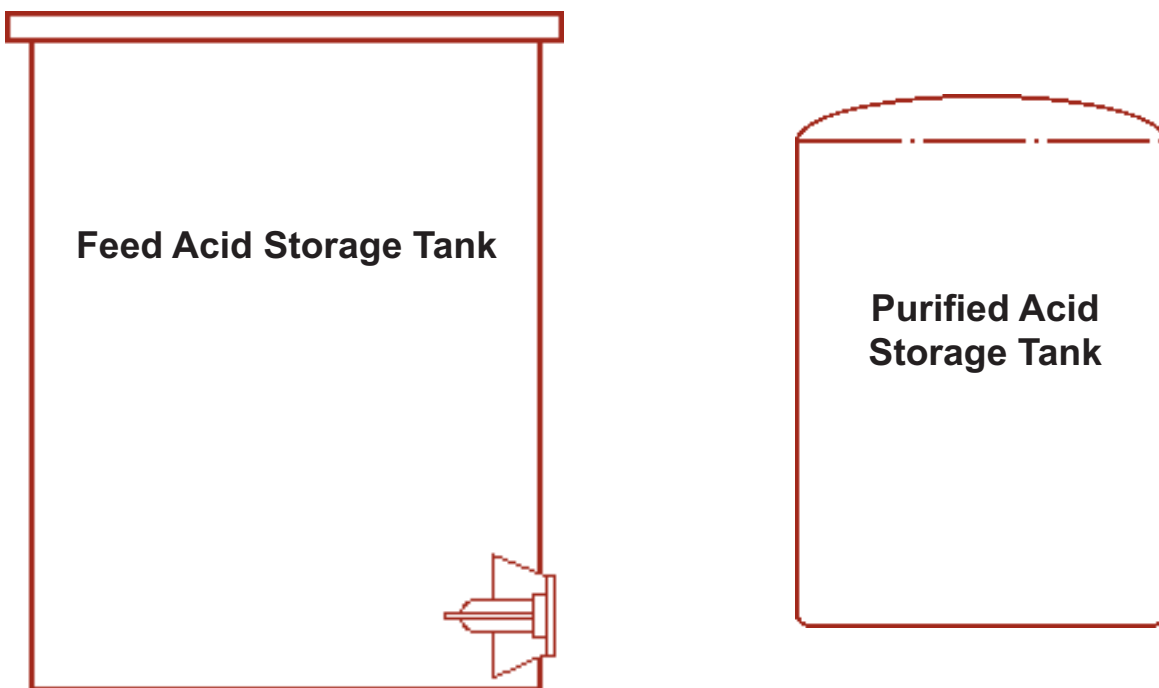
## Tank Specifications

### Eco-Tec Feed Acid Storage Tanks include:

- Rotationally molded seamless polyethylene construction
- Open top design (to promote cooling)

### Eco-Tec Purified Acid Storage Tanks include:

- Rotationally molded seamless polyethylene construction
- Closed top design with all connections through top
- Product Transfer pump is an oil-free air diaphragm design with inlet and outlet valves, manual air valve and regulator supplied

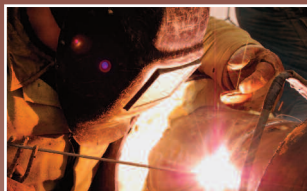


System Number	Feed Acid Storage Tank Dimensions (cm/inches)		Product Acid Storage Tank Dimensions (cm/inches)	
	Diameter	Height	Diameter	Height
CP6	140/55	158/62	140/55	173/68
CP8	178/70	198/78	163/64	214/84
CP10	178/70	198/78	178/70	247/97

### Notes:

- No level control modules are provided for the Feed Acid Storage Tank. Ensure that provisions are made to prevent accidental overflow during fill-up.

# Full-scale Design & Manufacturing



## Quality Design and Construction

- ISO 9001 registered design and manufacturing facility in Pickering, Ontario
- Built to global industrial standards
- Compact, skid mounted (including resin installation) and wet tested at Eco-Tec facility

## Innovations

- Eco-Tec has been supplying Recoflo® ion exchange systems for industrial treatment and water purification applications since 1970 with more than 2,000 systems installed in over 60 countries
- Eco-Tec continues to develop product improvements and new processes at its in-house Research and Development facility

## Technical Service and Support

- On-site commissioning supervision, performance demonstration, and operator training
- Performance monitoring and technical support program (Eco-SERV/Eco-TRAC™ / Eco-LINC™)
- 24/7 telephone access to technical services support
- Extensive spare parts inventory for next day shipment of most replacement parts



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